

In the claims:

Please amend the claims so that the claims read as follows:

1 – 94. (Cancelled)

95. (New) An apparatus for use during the abatement of a semiconductor manufacturing process comprising:

an upper reaction chamber having:

an interior porous wall that defines a central chamber;

an outer wall that surrounds the interior porous wall and that defines an interior space between the outer wall and the interior porous wall;

at least one waste gas inlet in fluid communication with the central chamber and adapted to introduce a gaseous waste stream to the central chamber;

at least one fuel inlet adapted to introduce a fuel into the central chamber, where the fuel inlet is positioned to introduce fuel through a path that does not pass through pores of the porous wall;

at least one oxidant inlet adapted to introduce an oxidant into the central chamber, where the oxidant inlet is positioned to introduce oxidant through a path that does not pass through pores of the porous wall;

a thermal mechanism positioned within the central chamber and adapted to form reaction products from the gaseous waste stream within the central chamber;

a fluid delivery system adapted to provide a fluid to the central chamber through the interior porous wall at a sufficient force to reduce deposition of reaction products on an inner surface of the interior porous wall of the central chamber; and

a lower reaction chamber coupled to the upper reaction chamber and having:

a gas flow chamber in fluid communication with the central chamber, the gas flow chamber having an inlet and outlet for passing the gaseous waste stream and reaction products through the gas flow chamber;

a water delivery system adapted to generate a flowing liquid film on an interior surface of the gas flow chamber so as to reduce deposition and accumulation of particulate solids on the interior surface of the gas flow chamber; and

at least one inlet adapted to introduce an oxidant to the gaseous waste stream.

96. (New) The apparatus according to claim 95, wherein the interior space positioned between the outer exterior wall and the interior porous wall is an interior annular space.
97. (New) The apparatus according to claim 96, wherein the means for introducing a fluid into the interior space is adapted to introduce pressurized fluid into the interior annular space.
98. (New) The apparatus according to claim 95, wherein the means for introducing a fluid into the interior space is adapted to introduce fluid selected from the group consisting of water, steam, an inert gas, a heated gas, air, clean dry air, and clean enriched air.
99. (New) The apparatus according to claim 98, wherein the means for introducing a fluid into the interior space is adapted to introduce water.
100. (New) The two-stage reactor according to claim 95, wherein the means for introducing a fluid into the interior space is adapted to introduce fluid into the interior space under pulsing conditions.

101. (New) The apparatus according to claim 100, wherein the means for introducing a fluid into the interior space is adapted to inject fluid into the central chamber under periodic pulsing.
102. (New) The apparatus according to claim 100, wherein the means for introducing a fluid into the interior space is adapted to introduce fluid into the interior space under pulsing conditions using a pulsation duration of from about 3 msec to 1 sec.
103. (New) The apparatus according to claim 95, wherein the lower reaction chamber includes at least one oxidant inlet positioned to introduce an oxidant to the gas flow chamber.
104. (New) The apparatus according to claim 95, further comprising a combustible fuel supply coupled to the fuel inlet, wherein the combustible fuel supply is adapted to supply, propane, natural gas, methane or hydrogen.
105. (New) The apparatus according to claim 95, wherein the means for introducing a fluid into the interior space comprises a liquid vortex positioned near the inlet of the gas flow chamber.
106. (New) The apparatus according to claim 105, wherein the liquid vortex comprises:
- an outer shell having a top plate, a central opening in fluid communication with the central chamber;
 - a conical-shaped baffle within the outer shell having an inner surface and a central opening which is generally aligned with the interior surface of the gas stream flow chamber, the conical-shaped baffle generally concentrically aligned with the inner surface of the outer shell to form a concentric chamber; and
 - a liquid inlet arranged to tangentially introduce liquid into the concentric chamber, thereby filling the concentric chamber with liquid to create a swirling motion, causing the liquid to rise and overflow the conical-shaped baffle to form a

sheet of fluid on the inner surface of the conical-shaped baffle that flows downwardly onto the interior surface of the gas stream flow chamber.

107. (New) The apparatus according to claim 106, wherein the sheet of fluid on the inner surface of the conical-shaped baffle inhibits contact of an entering gas stream with the interior surface of the gas stream flow chamber thereby resisting deposition of reaction products thereon.
108. (New) The apparatus according to claim 95, wherein the interior porous wall is fabricated of a material comprising ceramic, sintered ceramic, sintered metal, porous plastic, porous metal material or a porous polymeric material.
109. (New) The apparatus according to claim 108, wherein the interior porous wall comprises pores uniformly distributed in the porous material.
110. (New) The apparatus according to claim 95, wherein the outer exterior wall and the interior porous wall are separated a sufficient distance to provide an annular space and for distributing a pressured gas for passage through the interior porous wall.
111. (New) The apparatus according to claim 110, wherein the interior porous wall comprises a plurality of apertures for passage of a pressurized gas through the interior porous wall into the central chamber.
112. (New) The apparatus according to claim 96, wherein the means for introducing a fluid into the interior space is adapted to introduce fluid that is compressed to a suitable pressure to facilitate pulsating ejection of the fluid with a force sufficient to reduce particle deposition on the inner surface of the central chamber.
113. (New) The apparatus according to claim 112, wherein the pressure is about 100 psig or less.

114. (New) The apparatus according to claim 111, wherein the plurality of apertures comprises conical shaped protuberances.

115. (New) An abatement system for treating gaseous pollutants in a gaseous waste stream, the system comprising:

an upper thermal reaction chamber comprising:

an outer exterior wall;

an interior porous wall, wherein the interior porous wall defines a central chamber and wherein the interior porous wall is positioned from the outer exterior wall a sufficient distance to define an interior annular space;

means for introducing a fluid to the interior annular space;

thermal means for forming reaction products from the gaseous waste stream;

at least one waste gas inlet for conducting the gaseous waste stream into the upper thermal reactor;

at least one fuel inlet adapted to introduce a fuel into the central chamber, where the fuel inlet is positioned to introduce fuel through a path that does not pass through pores of the porous wall; and

at least one oxidant inlet adapted to introduce an oxidant into the central chamber, where the oxidant inlet is positioned to introduce oxidant through a path that does not pass through pores of the porous wall; and

a lower reaction chamber comprising:

a gas flow chamber in fluid communication with the central chamber;
and

least one oxidant inlet positioned to introduce an oxidant to the gas stream flow chamber;

wherein the lower reaction chamber includes a liquid vortex positioned between the central chamber and the gas flow chamber, wherein the liquid vortex comprises:

an outer shell having a top plate, a central opening in fluid communication with the central chamber;

a conical-shaped baffle within the outer shell having an inner surface and a central opening which is generally aligned with the interior surface of the gas stream flow chamber, the conical-shaped baffle generally concentrically aligned with the inner surface of the outer shell to form a concentric chamber; and

a liquid inlet arranged to tangentially introduce liquid into the concentric chamber, thereby filling the concentric chamber with liquid to create a swirling motion, causing the liquid to rise and overflow the conical-shaped baffle into the gas stream flow chamber to form a sheet of fluid on the inner surface of the conical-shaped baffle that flows downwardly onto the interior surface of the gas stream flow chamber.

116. (New) The abatement system according to claim 115, wherein the at least one waste gas inlet comprises a conduit terminating with a portion of the conduit within the central chamber wherein the portion of the conduit is located within a tube which projects beyond the end of the conduit to define a chamber within the tube for flame formation, the tube having an open end communicating with the central chamber.
117. (New) The abatement system according to claim 115, wherein the interior porous wall provides for transference of the fluid from the interior annular space into the central chamber at a sufficient force to reduce deposition of reaction products on the interior porous wall.

118. (New) The abatement system according to claim 115, wherein the interior porous wall comprises a porosity of about 80% or less.
119. (New) The abatement system according to claim 115, wherein the means for introducing a fluid to the interior annular space is adapted to introduce pressurized fluid into the annular space.
120. (New) The abatement system according to claim 115, wherein the means for introducing a fluid to the interior annular space is adapted to introduce fluid selected from the group consisting of water, air, clean dry air, and clean enriched air.
121. (New) The abatement system according to claim 115, wherein the means for introducing a fluid to the interior annular space is adapted to introduce water.
122. (New) The abatement system according to claim 117, wherein the means for introducing a fluid to the interior annular space is adapted to inject steam through the interior porous wall.
123. (New) The abatement system according to claim 117, wherein the means for introducing a fluid to the interior annular space is adapted to introduce fluid under pulsing conditions.
124. (New) The abatement system according to claim 115, further comprising a combustible fuel supply coupled to the at least one fuel inlet, wherein the combustible fuel supply is adapted to supply, propane, natural gas, methane or hydrogen.